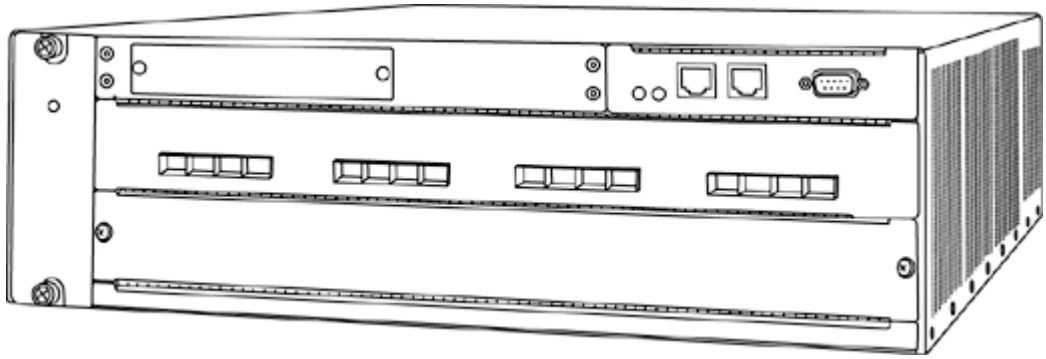
Overview

The Cisco MDS 9216A Multilayer Fabric Switch shares a consistent architecture with the MDS 9500 series Directors and offers the same multilayer intelligence in a modular fabric switch. Intelligent features include multi-protocol support (Fibre Channel, iSCSI, FCIP), Virtual SANs (VSANs), embedded diagnostics and role-based security. With these innovations, companies can build highly scalable, available storage networks with comprehensive security and unified management.

The MDS 9216A is fully populated out of the box with sixteen 1 and 2 Gb auto-sensing Fibre Channel ports. An expansion slot allows for the addition of an MDS 9000 Storage Networking Module available in 1, 2, 4 and 10Gb versions and in port increments of 8, 12, 16, 24, 32, or 48 ports, for up to 64 Fibre Channel ports or for FC/IP connectivity. The MPS 18/4 module along with the optional Cisco MDS 9200 Storage Media Encryption package can provide encryption for data at rest on storage tape media for added security to the SAN environment. MDS 9000 Storage Networking Modules are interchangeable between the MDS 9216A Fabric Switch, MDS 9216i Fabric Switch and MDS 9500 series directors, providing smooth migration, common sparing and investment protection.



Models

Cisco MDS 9216A A7558A

NOTE: Chassis ships with one modular expansion slot; includes 16 Fibre Channel ports populated with short wave SFPs (A7428A), RJ-45 10/100 Ethernet management port, RJ-45 console port, and DB-9 COM port; also includes software image, dual power supplies, power cords, fan modules, and 19-inch mounting rack kit.

Overview

Key Features and Benefits

- Reduced Total Cost of Ownership (TCO) for SAN Infrastructure
  - Enables storage consolidation, simplified management of SAN environment
  - Integrates Fibre Channel, iSCSI, and FCIP in one system
- High Port Density
  - 16 to 64 Fibre Channel ports (auto-sensing 4/2/1 Gb) in single chassis
  - Up to 8 1 Gb Ethernet ports in a single switch (configurable for iSCSI or FCIP)
  - Up to 4, 10Gb Fibre Channel ports for ISL connections between switches
- Scalable
  - Supports throughput up to 16 ports in a single PortChannel ISL
  - 1 extension slot for MDS 9000 Storage Networking Modules
- Highly Available
  - Redundant power supplies and fans for high availability - Hot-swappable SFP optical interface modules, fan modules, and power modules
- Hardware Assisted Encryption Security:
  - On-board crypto processing engine supports secure IEEE standard Advanced Encryption Standard (AES) 256-bit algorithms to encrypt data transported over IP networks or to be stored on tape.
  - IPsec for Encrypted Data in Transit over IP networks
  - Storage Media Encryption of Data at Rest on tape - FIPS 140-2, level 2 certifications.
- Intelligent network services:
  - Uses virtual SAN (VSAN) technology for hardware-enforced, isolated environments within a single physical fabric.
  - Access control lists (ACLs) for hardware-based intelligent frame processing.
  - Advanced traffic-management features such as Fibre Channel Congestion Control (FCC) and fabric-wide quality of service (QoS) to facilitate migration from SAN islands to enterprise-wide storage networks.
- Sophisticated diagnostics:
  - Provides intelligent diagnostics, protocol decoding, and network-analysis tools as well as integrated Call Home capability for added reliability, faster problem resolution, and reduced service costs.
- Interoperable
  - Broad range of HP servers and operating systems
  - Disk and tape storage devices
  - Open platform for hosting 3rd party storage applications, such as virtualization
- Integrated Management
  - Embedded Fabric Manager
  - Optional Fabric Manager Server
  - Integration with CiscoWorks Resource Manager Essentials (RME)

Product Highlights

Cisco MDS 9216A Multilayer Fabric Switch	Supports from 16 to 64 Auto-Sensing 10/4/2/1-Gb Auto-Sensing Fibre Channel ports and up to 8 1-Gb Ethernet ports (user configurable for iSCSI or FCIP) in a single switch.
Network-based Intelligent Storage Applications	• Data replication • Network assisted Back-up
Security	Supports role-based access control, VSANs, hardware-enforced Zoning, FC-SP, ACLs, RADIUS authentication, SNMPv3, SSH, and SFTP.
Intelligent network services	• Virtual SANs (VSANs) • PortChannels • Quality of Service (QoS) • Security • Embedded Diagnostics
High Availability	Full redundancy of all major components for a new standard in Fabric Switch availability.
Multiprotocol/ Multitransport	• Enables a consistent feature set over a protocol agnostic switch fabric • Seamlessly integrates Fibre Channel, iSCSI, and FCIP in one system • Allows integration of future storage protocols with its flexible architecture
Embedded Diagnostics	Provides industry-first intelligent diagnostics, including Fibre Channel ping and trace route, SPAN, protocol analysis and decoding, Zone and VSAN merge analysis.
PortChannels	Allows users to aggregate up to 16 physical links into one logical bundle. The bundle can consist of any port in the chassis, ensuring that the bundle remains active in the event of a port, ASIC, or module failure. The bundle can sustain the failure of any physical link without causing a reset. Additionally, Fabric Shortest Path First (FSPF) multipathing provides the intelligence to load balance across up to 16 equal cost paths and, in the event of a switch failure, to dynamically reroute traffic.
Access Control Lists (ACLs)	Hardware-based intelligent frame processing.
Traffic management	• Fibre Channel Congestion Control (FCC) • Fabric-wide QoS

Product Highlights

Management modes

- Cisco MDS 9000 Family Command Line Interface (CLI)
- Cisco Fabric Manager
- Optional Cisco Fabric Manager Server
- Integration with Cisco Resource Manager Essentials (RME)

Interoperability

- Offers compatibility with a broad range of HP servers and operating systems, as well as disk and tape storage devices
- Shares common architectural platform across all Cisco MDS 9500 Series Directors
- Interchangeable modules across Directors and Fabric Switches

Product Family Models

- Cisco MDS 9513 Multilayer Director- w/Dual Supervisor 2 -
  - Intelligent, multi-protocol 13-slot Director with up to 528 Auto-Sensing 4/2/1 Gb Fibre Channel ports
- Cisco MDS 9506 Multilayer Director
  - Intelligent, multi-protocol 6-slot Director with up to 192 Auto-Sensing 10/4/2/1 Gb Fibre Channel ports
- Cisco MDS 9509 Multilayer Director
  - Intelligent, multi-protocol 9-slot Director with up to 336 Auto-Sensing 10/4/2/1 Gb Fibre Channel ports
- Cisco MDS 9222i Multilayer Fabric Switch
  - Intelligent, multi-protocol modular Fabric Switch with eighteen 4-Gb Fibre Channel ports, four 1Gb Ethernet ports, a four port FCIP software license and an open modular expansion slot with up to a forty-eight ports of 4-Gbps Fibre Channel or 10-Gb Fibre Channel ports for Inter-Switch Links
- Cisco MDS 9216A Multilayer Fabric Switch
  - Intelligent, multi-protocol modular Fabric Switch with sixteen 2Gb Fiber Channel ports, plus one expansion slot with up to a total of 64 Auto-Sensing 10/4/2/1 Gb Fibre Channel ports
- Cisco MDS 9216i Multilayer Fabric Switch
  - Intelligent, multi-protocol modular Fabric Switch with fourteen 2Gb Fiber Channel port and two 1Gb Ethernet ports, plus one expansion slot with up to a total of 62 Auto-Sensing 10/4/2/1 Gb Fibre Channel ports
- Cisco MDS 9120 Multilayer Fabric Switch
  - Intelligent, Fibre Channel Fabric Switch with 20 Auto-Sensing 2/1 Gb Fibre Channel ports
- Cisco MDS 9140 Multilayer Fabric Switch
  - Intelligent, Fibre Channel Fabric Switch with 40 Auto-Sensing 2/1 Gb Fibre Channel ports
- Cisco MDS 9020 Fabric Switch
  - Fibre Channel fabric Switch with 20 Auto-Sensing 4/2/1 Gb Fibre Channel Ports

Software Components, Standard

SAN-OS

Cisco MDS 9000 SAN-OS delivers numerous advanced storage networking capabilities for the Cisco MDS 9000 Family of Multilayer Intelligent Directors and Fabric Switches.

Product Highlights

Cisco Fabric Manager	Cisco Fabric Manager is a responsive, easy-to-use Java application that simplifies management across multiple switches and fabrics. Cisco Fabric Manager enables administrators to perform vital tasks such as topology discovery, fabric configuration and verification, LUN security, monitoring, and fault resolution. All functions are available through a secure interface, which enables remote management from any location. Cisco Fabric Manager may be used independently or in conjunction with third-party management applications. Cisco provides an extensive API for integration with third-party and user developed management tools.

Software Components, Optional

Cisco Fabric Manager Server Package	The "Standard" Cisco Fabric Manager software that is included at no charge with the MDS family switches provides basic switch configuration and troubleshooting capabilities. The Cisco Fabric Manager Server (FMS) Package extends Cisco Fabric Manager by providing historical performance data collection for network traffic hot-spot analysis, centralized management services and advanced application integration.
Cisco MDS 9200 FCIP Services License	Cisco MDS 9000 Family IP Storage Services Modules and the MDS 9000 Multiprotocol module support interconnection of remote SAN islands and extend SAN connectivity to IP-enabled servers using the FCIP services. This feature is licensed separately on a per module basis (except the MDS 9216i which includes a 2-port FCIP license for the 2 embedded 1GB Ethernet IP ports).
Cisco Enterprise Package	Cisco MDS switches have a set of advanced traffic engineering and advanced security features that are recommended for all Enterprise SANs. These features are bundled together in a management application called the Cisco MDS 9000 Enterprise Package.
Cisco MDS 9000 Family SME Package	Cisco MDS 9000 Family SME Package allows encryption of storage media (data at rest). Strong, standard IEEE AES-256 encryption for heterogeneous tape devices and VTLs as well as tape data compression are provided as a distributed fabric service.
Cisco MDS 9000 Family Mainframe Package	The Cisco MDS 9000 Family Mainframe Package is a comprehensive collection of features required for using the Cisco MDS 9200 Series switches in mainframe storage networks, including FICON protocol and CUP management, switch cascading, fabric binding, and intermixing.

Warranty

(1-1-1) Hardware Warranty; 1-year parts; 1-year on-site (8x5, next business day response) and 1-year labor.
NOTE: The hardware warranty covers firmware and embedded non-saleable software. For extended hardware installation and maintenance information, click the links below:
http://h18005.www1.hp.com/services/carepaq/us/install/
http://h18005.www1.hp.com/services/carepaq/us/hardware/.
NOTE: Certain restrictions and exclusions apply. Consult the Customer Support Center for details. Hardware or Software product installation is not included in the warranty, but is available and highly recommended.

HP Service & Warranty Support

HP Service & Warranty Support Additional Warranty protection and/or HP Installation packages can be purchased.
NOTE: Certain restrictions and exclusions apply. Consult the Customer Support Centre for details. HP provides a one-year, hardware limited warranty, fully supported by a worldwide network of resellers and service providers.

In addition, available service offerings include a full range of HP Care Pack packaged hardware and software services:

- Installation
- Extended coverage hours and enhanced response times
- System management and performance services

For more information on warranty and support options, please visit our Web site at:
http://www.hp.com/hps/tech/storage/supp/.

Software Product Services

Software Warranty - HP warrants only that the software media will be free of physical defects for a period of ninety (90) days from delivery.

EXCLUSIVE REMEDY – The entire liability of HP and its suppliers and your exclusive remedy for software that does not conform to this Limited Warranty shall be the repair or replacement of the defective media. This warranty and remedy are subject to your returning the defective media during the warranty period to HP in the country in which you obtained the software.

NOTE: Certain restrictions and exclusions apply. Consult the Customer Support Center for details.

Hardware or Software product installation is not included in the warranty, but is available and highly recommended.

HP Care Pack Services Warranty Upgrade Options

Service offerings include a full range of Customer HP Care Pack services for both hardware and software services:

- Response – Upgrade on-site response from next business day to same day 4-hours
- Coverage – Extend hours of coverage from 5 days x 9 hours to 7 days x 24 hours
- Duration – Select duration of coverage for a period of 1, 3, or 5 years
- Additional Warranty protection and/or HP Installation packages can be purchased.

NOTE: Certain restrictions and exclusions apply. Consult the HP Customer Support Center for details.

Service and Support, HP Care Pack, and Warranty Information

HP Care Pack Information

HP Care Pack is defined as an upgrade to the product warranty attribute, available for a specific duration and hours of coverage.

- HP Care Pack is not available for less than the product's warranty duration.
- HP Care Pack is available for sale anytime during the warranty period for most products, but the commencement date will be the same as the Warranty Start Date (delivery date to end user customer). Proof of purchase may be required.
- HP Care Pack services are prepaid.

For additional HP Care Pack (hardware & software) information, as well as orderable part numbers, please refer to the URL listed below:
http://h18005.www1.hp.com/services/carepaq/index.html

Additional Services

Installation service; SAN Solution service; SAN-Environmental Support service; SAN Architecture service; Proactive 24.

For more information on these and other service options, please contact any of our worldwide sales offices or visit our Web site at:
http://www.hp.com/hps/support

	Cisco MDS 9513 w/Dual Supervisor 2	Cisco MDS 9509 w/Dual Supervisor 2	Cisco MDS 9506 w/Dual Supervisor 2	Cisco MDS 9222i	Cisco MDS 9216i	Cisco MDS 9216A	Cisco MDS 9124	Cisco MDS 9124e Fabric Switch for HP c-Class BladeSystem
Introduction Date	May 2006	May 2006	May 2006	November 2007	May 2006	Dec 2005	March 2007	March 2007
Switch Type	Multilayer Director	Multilayer Director	Multilayer Director	Multilayer Fabric Switch	Multilayer Fabric Switch	Multilayer Fabric Switch	Fabric Switch	Embedded Switch
Maximum ports	528 Fibre Channel, 58 IP ports	336 Fibre Channel, 50 IP ports	192 Fibre Channel, 26 IP ports	18 fixed auto-sensing 4/2/1-Gbps Fibre Channel ports, 4 1-Gb Ethernet ports	64, up to 62 Fibre Channel, 10 IP ports	64 FC, up to 16 FC and 8 IP ports	Up to 24 Fibre Channel ports	Up to 24 Fibre Channel ports
Number of slots per chassis	Thirteen	Nine	Six		Two	Two	N/A, Fixed FRU	NA

NOTE: Please Refer to SAN Design Guide pointer
http://www.hp.com/go/SANdesign or http://www.hp.com/go/SANdesignguide

Step 1 – Base Configuration

Select one:

Model	Model Description	Part Number
Cisco MDS 9216A Multilayer Fabric Switch	Cisco MDS 9216A NOTE: Chassis ships with one modular expansion slot. Includes 16 Fibre Channel ports populated with short wave SFPs (A7428A), RJ-45 10/100 Ethernet management port, RJ-45 console port, and DB-9 COM port; also includes software image, dual power supplies, power cords, fan modules, and 19-inch mounting rack kit.	A7558A

Step 2 – Options

Model Description	Quantity	Part Number
Fibre Channel Port Expansion Modules		
HP MDS 9000 2 Gb FC SFP SW XCVR	Spares	A7428A
HP MDS 9000 2 Gb FC SFP LW		A7429A
HP MDS 9000 32-port Storage Services Module, includes 32 short wave SFPs (A7428A)	1 Max	AE378A
HP MDS 9200 Storage Services Module Application Enabler License To Use. (Required for Network Hosted Applications which use SAN Tap and ISAPI services on Storage Services Module)	1 MAX	T4318A
HP MDS 9000 12-port, 4 Gb FC module, (SFPs Not included)*	1 Max	AE383A
HP MDS 9000 24-port, 4 Gb FC module, (SFPs Not included)*	1 Max	AE384A
HP MDS 9000 48-port, 4 Gb FCmodule, (SFPs Not included)*	1 Max	AE385A
HP MDS 9000 4Gb FC SFP, 4 PK Shrt Range XCVR	Not Included	AE379A
HP MDS 9000 4Gb F C SFP, Lng Range XCVR	Not Included	AE380A
HP MDS 9000 4-port, 10 Gb FC Module (DOES NOT include SFPs)*		AE386A
HP MDS 9000 10 Gb FC SFP Shrt Wave XCVR	4 Max	AE381A
HP MDS10 Gb FC Long Wave Transceiver	4 Max	AE456A
Cisco MDS 9000 4 Gb FC 4km Transceiver		AE494A
NOTE: All 4 and 10Gb Fibre Channel ports require transceivers to be ordered separately from the list above.		
FCIP & iSCSI Expansion Modules		
HP MDS 9000 8 Pt 1GE IP STG Srvcs Module,	1 max	A7470A
HP MDS 9200 8-pt FCIP Srvcs SW LTU NOTE: FCIP software licenses are required for FCIP operation.	1 per A7470A	A7474A
HP MDS 9200 4-prt FCIP Srvcs SW LTU NOTE: FCIP software licenses are required for FCIP operation.	1 per A7562A	T3695A
HP MDS 14+2 w/o Ethernet SFP Module 14 short wave, 2 Gb FC SFPs are included.	1 max	AE391A
HP MDS 9200 FCIP 2-pt Srvcs SW LTU NOTE: The 2 port FCIP software license is only required for FCIP operation with optional MDS 9000 Family Multiprotocol Services Module.	1 per A7559A	T3678A
1 GB Ethernet & 1-2 GB short wave SFP, LC *		A7487A
1 GB Ethernet & 1-2 GB long wave SFP, LC *		A7488A
HP MDS 9000 1Gb-E-net SFP, Copper XCVR *	10 Max	AE382A
HP MDS 9000 18+4 w/0 SFP Module (does not support AE382A Copper Transceiver)	4 Max	AG852A
HP MDS 9500 MPS 18/4 FCIP Module LTU, required for FCIP operation with AG852A		T5413A

Configuration Information

MDS 9000 10Gb Fibre Channel 2X Entended Range Transceiver		AG861A
MDS 9000 10Gb Fibre Channel 2X Copper Transceiver		AG870A
Cisco MDS 9000 10Gb Ethernet X2 Short Range Transceiver		AG871A
Cisco MDS 9000 Encryption Key Manager Smart Card Reader		AG872A
Cisco MDS 9000 Encryption Key Manager Smart Card		AG873A
Cisco MDS 9000 15 Metre Cable for 10Gb Copper Short Range X2 Transceivers		AG876A
Cisco MDS 9000 1 Metre Cable for 10Gb Copper Short Range X2 Transceivers		AG877A
HP StorageWorks CWDM 4-port Multiplexer A		AG878A
HP StorageWorks CWDM 4-port Multiplexer B		AG879A
HP StorageWorks CWDM 8-port Multiplexer		AG880A
HP StorageWorks CWDM Multiplexer Chassis		AG881A
HP 2m Single-Mode LC/LC Fibre Channel Cable Used for CWDM solution	1 Pack	AK345A
HP 5m Single-Mode LC/LC Fibre Channel Cable Used for CWDM solution	1 Pack	AK346A

* 1 GB Ethernet SFPs required for all IP services ports, Choose from optical or copper above. HP MDS 9000 18+4 w/0 SFP Module does not support AE382A Copper Transceiver.

Optional Software Licenses

HP MDS 9200 FabMgr Sv -1 MDS 9200 swt LTU		A7513A
HP MDS 9200 Enterprise Package license for 1 MDS 9200 switch, Required for Inter-VSAN routing, QoS management, IPsec security, LUN zoning and individual port security	Required for each Switch	A7516A
HP MDS 9200 Stor SrvcS Mod Enabler LTU(Required for Network and switch Hosted Applications which use SAN Tap and ISAPI services on Storage Services Module)	Required for each Module	T4318A
Cisco MDS 9200 Mainframe FICON Software License To Use. XP Array configurations only & HP Services Installation and Startup Statement of Work, HA546A1, is required	Required for each Switch used for FICON Plus prerequisite HP C&I Service	T4409A
Cisco MDS 9200 Storage Media Encryption package for one MPS 18/4 Module LTU		T5418A

Course Wave Division Multiplexer Solution

HP 4 Wavelength Add/Drop Mux, w/Chassis	2Gb only LC/SC	A7483A
HP 8 Wavelength Mux/Demux, w/Chassis	2Gb only LC/SC	A7484A
HP 1470 NM CWDM 2Gb FC SFP XCVR (works only with A7483A and A7484A multiplexers)		A7476A
HP 1510 NM CWDM 2Gb FC SFP XCVR (works only with A7483A and A7484A multiplexers)		A7477A
HP 1530 NM CWDM 2Gb FC SFP XCVR (works only with A7483A and A7484A multiplexers)		A7478A
HP 1550 NM CWDM 2Gb FC SFP XCVR (works only with A7483A and A7484A multiplexers)		A7479A
HP 1570 NM CWDM 2Gb FC SFP XCVR (works only with A7483A and A7484A multiplexers)		A7480A
HP 1590 NM CWDM 2Gb FC SFP XCVR (works only with A7483A and A7484A multiplexers)		A7481A
HP 1610 NM CWDM 2Gb FC SFP XCVR (works only with A7483A and A7484A multiplexers)		A7482A
HP LC/SC 1 Metre Fibre Cable (works only with A7483A and A7484A multiplexers)		A7485A
HP LC/SC 5 Metre Fibre Cable (works only with A7483A and A7484A multiplexers)		A7486A
MDS 9000 1470 NM CWDM 4Gb FC SFP Transceiver		AG853A

Configuration Information

MDS 9000 1490 NM CWDM 4Gb FC SFP Transceiver	AG854A
MDS 9000 1510 NM CWDM 4Gb FC SFP Transceiver	AG855A
MDS 9000 1530 NM CWDM 4Gb FC SFP Transceiver	AG856A
MDS 9000 1550 NM CWDM 4Gb FC SFP Transceiver	AG857A
MDS 9000 1570 NM CWDM 4Gb FC SFP Transceiver	AG858A
MDS 9000 1590 NM CWDM 4Gb FC SFP Transceiver	AG859A
MDS 9000 1610 NM CWDM 4Gb FC SFP Transceiver	AG860A
Dense Wave Division Multiplexer solution	
MDS 9000 3661 NM DWDM 2Gb SFP Transceiver	AG862A
MDS 9000 3582 NM DWDM 2Gb SFP Transceiver	AG863A
MDS 9000 3504 NM DWDM 2Gb SFP Transceiver	AG864A
MDS 9000 3425 NM DWDM 2Gb SFP Transceiver	AG865A
MDS 9000 3268 NM DWDM 2Gb SFP Transceiver	AG866A
MDS 9000 3190 NM DWDM 2Gb SFP Transceiver	AG867A
MDS 9000 3112 NM DWDM 2Gb SFP Transceiver	AG868A
MDS 9000 3033 NM DWDM 2Gb SFP Transceiver	AG869A
Installation Service	
Cisco MDS 9216i Installation Service	HA113A1#5D2

Step 3 - Accessories

Optical Cables	Part Number
LC-LC for between two 2 Gb devices	
2 m LC-LC Multi-Mode Fibre Channel Cable	221692-B21
5 m LC-LC Multi-Mode Fibre Channel Cable	221692-B22
15 m LC-LC Multi-Mode Fibre Channel Cable	221692-B23
30 m LC-LC Multi-Mode Fibre Channel Cable	221692-B26
50 m LC-LC Multi-Mode Fibre Channel Cable	221692-B27
LC-SC for between a 1 Gb and a 2 Gb device	
HP LC/SC 1 Meter Fibre Cable	A7485A
HP LC/SC 5 Meter Fibre Cable	A7486A
2 m LC-SC Multi-Mode Fibre Channel Cable	221691-B21
5 m LC-SC Multi-Mode Fibre Channel Cable	221691-B22
15 m LC-SC Multi-Mode Fibre Channel Cable	221691-B23
30 m LC-SC Multi-Mode Fibre Channel Cable	221691-B26
50 m LC-SC Multi-Mode Fibre Channel Cable	221691-B27

O/S Support	MDS SAN-OS Release 1.3(2) or later
Fibre Channel protocols	• Fibre Channel standards • FC-PH, Revision 4.3 (ANSI/INCITS 230-1994) • FC-PH, Amendment 1 (ANSI/INCITS 230-1994/AM1-1996) • FC-PH, Amendment 2 (ANSI/INCITS 230-1994/AM2-1999) • FC-PH-2, Revision 7.4 (ANSI/INCITS 297-1997) • FC-PH-3, Revision 9.4 (ANSI/INCITS 303-1998) • FC-PI, Revision 13 (ANSI/INCITS 352-2002) • FC-FS, Revision 1.9 (ANSI/INCITS 373-2003) [the final revision is 1.9, not 1.7] • FC-AL, Revision 4.5 (ANSI/INCITS 272-1996) • FC-AL-2, Revision 7.0 (ANSI/INCITS 332-1999) • FC-AL-2, Amendement 1 (ANSI/INCITS 332-1999/AM1-2003) • FC-SW-2, Revision 5.3 (ANSI/INCITS 355-2001) • FC-SW-3, Rev. 6.6 (ANSI/INCITS 384-2004) • FC-GS-3, Revision 7.01 (ANSI/INCITS 348-2001) • FC-GS-4, Rev. 7.91 (ANSI/INCITS 387-2004) • FC-BB, Revision 4.7 (ANSI/INCITS 342-2001) • FC-BB-2, Rev. 6.0 (ANSI/INCITS 372-2003) • FCP, Revision 12 (ANSI/INCITS 269-1996) • FCP-2, Revision 8 (ANSI/INCITS 350-2003) • FC-SB-2, Revision 2.1 (ANSI/INCITS 349-2001) • FC-SB-3, Revision 1.6 (ANSI/INCITS 374-2003) • FC-VI, Revision 1.84 (ANSI/INCITS 357-2002) • FC-FLA, Revision 2.7 (INCITS TR-20-1998) • FC-PLDA, Revision 2.1 (INCITS TR-19-1998) • FC-Tape, Revision 1.17 (INCITS TR-24-1999) • FC-MI, Revision 1.92 (INCITS TR-30-2002) • FC-SP, Revision 1.6 • FC-DA, Revision 3.1 • IP over Fibre Channel (RFC 2625) • Extensive IETF-standards based TCP/IP, SNMPv3, and Remote Monitoring (RMON) MIBs • Class of Service: Class 2, Class 3, Class F • Fibre Channel standard port types: E, F, FL, B • Fibre Channel enhanced port types: SD, ST, TE, TL
Features and functions	• Fabric services • Name server • Internet Storage Name Server (iSNS) • Registered State Change Notification (RSCN) • Login services • Fabric Configuration Server (FCS) • Private loop • Public loop • Translative loop • Broadcast • In-order delivery • Advanced Functionality • VSANs • Inter-VSAN Routing • PortChannel with Multipath Load Balancing • QoS-flow-based, zone-based

- Fibre Channel Congestion Control
- Extended Buffer-To-Buffer Credits
- Diagnostics and troubleshooting tools
- Power-on-self-test (POST) diagnostics
- Online diagnostics
- Internal port loopbacks
- SPAN and Remote SPAN
- Fibre Channel Traceroute
- Fibre Channel Ping
- Fibre Channel Debug
- Cisco Fabric Analyzer
- Syslog
- Online system health
- Port-level statistics
- Real Time Protocol Debug
- Network security
- Access Control Lists
- Per-VSAN role-based access control
- Fibre Channel Zoning
- N_Port WWN
- N_Port FC-ID
- Fx_Port WWN
- Fx_Port WWN and interface index
- Fx_Port domain ID and interface index
- Fx_Port domain ID and port number
- LUN
- Read-only
- Broadcast
- iSCSI zoning
- iSCSI name
- IP address
- Fibre Channel Security Protocol (FC-SP)
- DH-CHAP switch-switch authentication
- DH-CHAP host-switch authentication
- Port Security and Fabric Binding
- IPSec for FCIP and iSCSI
- IKEv1 and IKEv2
- Management access
- SSH v2 implementing AES
- SNMPv3 implementing AES
- SFTP
- Serviceability
- Configuration file management
- Nondisruptive software upgrades for Fibre Channel interfaces
- Call Home
- Power-management LEDs
- Port beaconing
- System LED
- SNMP traps for alerts
- Network boot

Performance

- Port speed:
  - 10/4/2/1-Gbps auto-sensing, optionally configurable

- Buffer credits:
  - Up to 255 per port
- Ports per chassis:
  - 16 to 64, 10/4/2/1-Gbps Fibre Channel ports, up to eight 1-Gbps Ethernet ports
- Ports per rack:
  - Up to 896
- PortChannel:
  - Up to sixteen ports

Cards, ports, slots

Base: 16 fixed auto-sensing 2/1-Gbps Fibre Channel ports

Expansion: 1 empty expansion slot

Network Management

- Access methods
- Out-of-band 10/100 Ethernet port
- RS-232 serial console port
- In-band IP-over-Fibre Channel
- DB-9 COM port
- Access protocols
- CLI-via console and Ethernet ports
- SNMPv3-via Ethernet port and in-band IP-over-Fibre Channel access
- Distributed Device Alias service
- Network security
- Per-VSAN role-based access control using RADIUS and TACACS+ based authentication, authorization, and accounting (AAA) functions
- SFTP
- SSH v2 implementing AES
- SNMPv3 implementing AES
- Management applications
- Cisco MDS 9000 Family CLI
- Cisco Fabric Manager
- Cisco Device Manager
- CiscoWorks 2000 Resource Manager Essentials

Reliability and Availability

- Hot-swappable, 1+1 redundant power supplies
- Hot-swappable fan tray with integrated temperature and power management
- Hot-swappable SFP optics
- Hot-swappable switching module
- Stateful process restart
- Any module, any port configuration for PortChannels
- Fabric-based multipathing
- Per-VSAN fabric services
- Passive backplane
- Online diagnostics

Programming Interfaces

- Scriptable CLI
- Fabric Manager GUI
- Device Manager GUI

Approvals and Compliance

- Safety compliance
  - CE Marking
  - UL 60950
  - CAN/CSA-C22.2 No. 60950
  - EN 60950
  - IEC 60950
  - TS 001
  - AS/NZS 3260

- IEC60825
- EN60825
- 21 CFR 1040

- EMC compliance
  - FCC Part 15 (CFR 47) Class A
  - ICES-003 Class A
  - EN 55022 Class A
  - CISPR 22 Class A
  - AS/NZS 3548 Class A
  - VCCI Class A
  - EN 55024
  - EN 50082-1
  - EN 61000-6-1
  - EN 61000-3-2
  - EN 61000-3-3

Power and Cooling

- Power supply (845W AC)
  - AC input characteristics
  - 100 to 240 VAC (10% range)
  - 50-60Hz (nominal)
- Airflow
  - 200 linear feet per minute (lfm) through system fan assembly.
  - Cisco recommends that you maintain a minimum air space of 6 inches (16 cm) between walls and the chassis air vents and a minimum separation of 12 inches (30.5 cm) between two chassis to prevent overheating.

Environmental

Temperature, ambient operating	32° to 104° F (0° to 40° C)
Temperature, ambient non-operating and storage	40°F to 158° F (-40°C to 75° C)
Relative humidity, ambient (non-condensing) operating	10 to 90%
Relative humidity, ambient (non-condensing) non-operating and storage	10 to 95%
Altitude, operating	-197 to 6500 feet (-60 to 2000 meter)

Dimensions (HxWxD)

5.25 x 17.32 x 22.66 in (13.34 x 43.99 x 57.56 cm)
3 Rack Units (RU)
All units rack mountable in standard 19 inch EIA rack

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